ASPD Course: 134-0098.1M17 Summer 2017

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**Lesson Plan:** Where the Waste Goes? Understanding Waste/Trash in New York City

Subjects: ELA, Earth Science, Ecology and Environmental Science

Grade-level: Middle School, 6-8

Standard: **Grade 6**: ELA.SL.6.1c, ELA.SL.6.1d Math 6.NS.7.a; Science 6.P.2.1– 6.P.2.3 **Grade 8:** Math 8.SP.1; Science 8.P.1.1, 8.P.1.2

**Time required:** 3 days (45 min.)

**Materials required:** Paper, Pencil, Internet, Household Trash

**Related background** reading: Article from http://www.sciencejournalforkids.org

Radworks.org

**Related documents**: Video from YouTube DSNY- New York Garbage Trucks; Where Does NEW York City’s Trash Go?

**Related links: www.greencosrvices.com**

Lesson Description: In this lesson students will conduct investigate their own trash consumption and become aware of how improperly handled trash impacts the environment.

Building students knowledge regarding where our waste goes once it is disposed of. In addition, students will comprehend the difference between types of trash (biodegradable vs. non-biodegradable) and their affect the environment.

Learning Objectives

* Students will be able to define biodegradable and non-biodegradable waste.
* Students will be able to identify types of biodegradable and non-biodegradable trash.
* Students will understand the basic chemistry/biology of how materials biodegrade (or don’t!).
* Students will understand how recycling may off set the overall trash production in their household, community, city, and the state/country.
* Students will comprehend the process of trash disposal, from your house to the landfill.
* Students will discuss how they will change their current practices to ameliorate their own ‘trash’ situation.

Assessment Techniques

1. Students will fill out The Survey pre and post lesson

**Explanations to class**: This is a pre-activity that will be revisited after we (students) have gained instructional knowledge regarding proper waste disposal.

**Pre-activity**

Hand out the “Waste Disposal Survey” (WDS). Ask students to cut out all the potential sources of debris we generate in our daily lives. Students can fill in ‘waste items’ that are not listed. Once the ‘items’ are cut out, ask the students to organize them in the table according to where they think they belong. Tape or staple the items in the ‘appropriate’ category.

Make we (students) put our names on our table (on the front) and save them for later discussion. You can even display them around the room.

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| --- | --- | --- |
| Waste/Trash Disposal Survey  Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date:\_\_\_\_\_ | | |
|  | Unacceptable Items of Litter  (Trash you don’t want to throw on the ground) | Acceptable Items of Litter (Trash you think it’s okay to throw on the ground) |
| Bones/Meat |  |  |
| Broken Glass |  |  |
| Cans |  |  |
| Chip Bags |  |  |
| Cigarette Butts |  |  |
| Diapers |  |  |
| Doggy Poo |  |  |
| Food Wapp |  |  |
| Food Wappers |  |  |
| Fishing Line |  |  |
| Fruits |  |  |
| Glass Bottles |  |  |
| Needles |  |  |
| Paper |  |  |
| Plastic Bottles |  |  |
| Plastic Utensils |  |  |
| Styrofoam |  |  |

**Background Information**

As we all know, there is a significant ‘trash problem’ here in New York city, whether it is referring to the fact that our dump/landfill is overflowing and costing the government millions of dollars to remedy, or that our roadways, beaches, oceans, public and private property trash are littered with trash.

**Lesson Goals**

This lesson aims to:

1. Educate our youth that we can address this problem and clean up our island for good.

2. Develop a scientific understanding of the processes surrounding the disposal of our trash.

3. Comprehend that improperly disposed of trash negatively affects our livelihood (the watersheds, our reefs and fishing industries, and the tourism industry).

**Day 2**

**Biodegradable vs. non-biodegradable**

Refer to websites listed below for more information about biodegradable vs. non-biodegradable resources.

In the simplest terms “**biodegradable**” means a material that is able to degrade or break down. Examples of biodegradable materials are apple cores, bones, paper, flowers, serving utensils, plates made of corn products.

“**Non-biodegradable**” refers to materials that are not broken down by organisms. Examples of non-biodegradable materials are plastic, glass, polyester clothing items, and aluminum cans.

*Something is biodegradable when little tiny microorganisms in the earth can break the object apart and turn it into soil. It looks like the thing disappears, but it just becomes part of the soil.*

Things that are biodegradable are often made of organic materials, or things naturally occurring in our environment, not those synthetically produced in a lab. For instance, a banana peel is biodegradable and will take approximately 3 days to degrade, but a plastic bottle will take hundreds of years!

Take a diaper for example… how many years do you think it takes for a disposable diaper to biodegrade?

Answer: 500-600 YEARS!

2. **Challenge Questions**

1. Were your estimates close to the actual time taken for some items to degrade?

2. What most surprised you about the results?

**3.**Take Home Assignments – in response to videos shown in class.

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| --- | --- | --- |
| Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_ | | |
| **Item** | **Time Thought To Degrade** | **Time Actually taken to Degrade** |
| Apple |  |  |
| Aluminum Can |  |  |
| Battery |  |  |
| Bones |  |  |
| CDs |  |  |
| Cigarette Butt |  |  |
| Dead Animal |  |  |
| Diaper |  |  |
| Dorito bag |  |  |
| Newspaper |  |  |
| Paper Towel |  |  |
| Plastic Bottle Cap |  |  |
| Plastic Cup |  |  |
| Plastic Shopping Bag |  |  |
| Sky Cracker Tin |  |  |
| Styrofoam Plate/Cup |  |  |
| Tomato |  |  |

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| --- | --- |
| **Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_** | |
| **Product** | **Time to Biodegrade** |
| Paper towel |  |
| Newspaper |  |
| Apple core |  |
| Card box |  |
| Wax coated Milk Carton |  |
| Cotton gloves |  |
| Wool gloves |  |
| Plywood |  |
| Painted wooden sticks |  |
| Plastic bags |  |
| Tin cans |  |
| Disposable Diapers |  |
| Plastic bottles |  |
| Aluminum cans |  |
| Glass bottles |  |

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| --- | --- |
| **Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_** | |
| **Product** | **Time to Biodegrade** |
| Paper towel | 2–4 weeks |
| Newspaper | 6 weeks |
| Apple core | 2 months |
| Card box | 2 months |
| Wax coated Milk Carton | 3 months |
| Cotton gloves | 1–5 months |
| Wool gloves | 1 year |
| Plywood | 1–3 years |
| Painted wooden sticks | 13 years |
| Plastic bags | 10–20 years |
| Tin cans | 50 years |
| Disposable Diapers | 50–100 years |
| Plastic bottles | 100 years |
| Aluminum cans | 200 years |
| Glass bottles | Undetermined |

**4. Challenge questions**

**How much garbage and trash (municipal solid waste) do New York City produces a year?***Answer: 14 million tons trash each year.*

**2. Name three ways in which municipalities dispose of their garbage and trash.***Answer: It is buried in landfills, burned in incinerators and de- composed by composting.*

**3. Of what kind of material is most of our garbage and trash composed?***Answer: Most of our waste (over a third) is composed of paper products.*

**4. How is recycling helping our landfills?**

*Answer: Recycling helps to reduce the amount of trash we need to dispose of in landfills.*

**5. How many waste System the City has?**

*Answer: NYC has two waste systems- one public, one private.*

**Day 3: Assignment**

**In class**

Fold a piece of 8.5 x 11 paper in half, label one column Biodegradable, the other Non-Biodegradable.

**5. Take Home**

Have students record the items that they use in their daily lives over a give period of time (day, week, etc) and return to class with the following questions answered. As an added bonus, and for use in future experiments have students collect all their consumables and bring them to class.

Answer the following questions based on your assessment of the items you use in your daily lives. For questions that ask for your opinion (do you feel?), detailed complete sentences are required:

1. What do you consume more of biodegradable or non-biodegradable items?

2. Estimate how many pounds of trash do you produce in one day (weigh the bag of trash or each item, finger scales used for fishing can be helpful in this exercise). What about one week? A month? A year?

3. Look at the non-biodegradable items you consumed in a day. How many of those items can you reuse? How many of those items do you actually reuse? How many items do you ‘throw away’?

4. What percentage of the materials are you able to recycle? What percentage of the materials consumed did or will you recycle?

5. What does it mean to be sustainable? You can use the internet to formulate your own answer, consult this website:

You may also use the definition your teacher gave you. Do you think that they way you live is sustainable? Could your lifestyle be more sustainable? How?

6. Do you feel recycling is important? State why or why not.

7. Do you think recycling could be improved in NYC? State why or why not.

**6. Challenge Questions**

1. What are the advantages and disadvantages of biodegradable materials?

2. What are the advantages and disadvantages of non-biodegradable materials?

3. What non-biodegradable items could you live without in your life?

4. What non-biodegradable items that you use could be replaced with biodegradable ones?

**Activity**

Considering what has been taught so far have students organize the following items in ascending order according to the time it will take them biodegrade.

Apple Core, soy sauce bottle, picture frame, chicken bone, water bottle, soda can, tree branch, lamp shade, cracker tin, Doritos bag, diaper, sewing machine, rotten fruit.

**7. Post-activity**

Hand out a new copy of “Waste Disposal Survey” (WDS). Ask students to cut out all the potential sources of debris we generate in our daily lives. Students can fill in any they think of that aren’t listed. Once the ‘debris items’ are cut out, ask the students to organize them in the table according to where they think they belong. Explain the changes you made and why.

**Conclusion**

**Waste Disposal: Each time you throw something as garbage, think of where it will finally end up. Whether it is a plastic glass, your broken cell phone or the used up battery cells from your portable CD/MP3 player, they all contribute in some way to environmental pollution and are also hazardous to life. Not only are they biodegradable, but also disposing of them has their own risks as they release harmful toxins into the air and surrounding soil and ground**

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| Aluminum Can |  |  |
| Battery |  |  |
| Bones |  |  |
| CDs |  |  |
| Cigarette Butt |  |  |
| Dead Animal |  |  |
| Diaper |  |  |
| Dorito bag |  |  |
| Plastic Bottle Cap |  |  |
| Plastic Cup |  |  |
| Plastic Shopping Bag |  |  |
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| Styrofoam Plate/Cup |  |  |
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